



# HYDROCARBON

ENERGY EFFICIENCY • PERFORMANCE • SAVINGS

## SERVICE MANUAL R-290



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# R-290

# Frequently asked Questions



## R-290 FAQ



# What do I need to know to service HC equipment?

1. Do you need any specialized training to service R-290?

*No. The EPA has ruled specialized training is not required but is recommended. (North America)*

2. Where do I go for training?

*True Manufacturing offers HC Service Manual and training videos at [truemfg.com](http://truemfg.com).*

3. What tools are needed to service HC cabinets?

*There are only two specialized tools that are required for servicing HC equipment. A combustible gas meter/R-290 leak detector and a safety placard.*

*True has developed an HC service kit that includes the two specialized tools and other tools that we suggest be used.*

## Kit# 992987



**R-290 FAQ**


4. **Is there a maximum charge amount for commercial applications with R-290?** *Yes. You can only have a maximum charge amount of 150 grams (5.3 ounces) in each refrigeration system. For example, GDM-10 has a charge amount of 1.9oz*
5. **Are there special markings on a cabinet built using R-290? How will I be able to tell if the system I'm working on is built with R-290?**  
*Yes. The indicators are:*
  - *The serial number tag will indicate the type of refrigerant.*
  - *The unit will have multiple labels stating that it is built with an HC/R-290 refrigerant.*
  - *The unit will also have the process sleeves colored red. (North America)*
6. **Will I need different gauges to use with an R-290 system?** *No. The 134a manifold set can be used. Due to the small system charge amounts we suggest the use of the shortest hoses possible. Twelve inch hoses are included in our service kit.*
7. **Are there any specialized tools needed to service an R-290 refrigeration system?** *Yes. The two specialized tools are listed below.*
  - a. *A combustible gas meter/R-290 electronic leak detector. This is available through most HVAC supply houses. It is also available through True Parts. True Manufacturing Part Number 965087.*
  - b. *A safety placard advising of no smoking or open flames.**Standard refrigeration tools are still needed: Pinch Off Tool, Nitrogen, Vacuum Pump, Micron Gauge, Torches, Soap Bubbles, Manifold Set, and Tube Cutter.*
8. **Does the R-290 refrigerant have to be recovered?** *No.*
9. **How do we leak check an R-290 system?**  
*For the most part you would leak check an R-290 system the same way you would an R-134a or R-404A system with a couple of exceptions. You can still use a bubble solution or an ultrasonic leak detector as well. We would also recommend using oxygen free dry nitrogen with a trace gas not exceeding 200 PSI.*
  - *Exception #1 is you cannot use a halide leak detector on an R-290 system.*
  - *Exception #2 your electronic leak detector must be designed specifically for combustible gas.*
10. **Where can I get R-290 refrigerant?** *For use on True warranty repairs you can get this refrigerant directly from the True parts department. You can also source the refrigerant from an HVAC supply house or a company that sells gases and welding supplies. Note: If you are getting refrigerant somewhere besides True make sure you are purchasing refrigerant grade propane R-290.*
11. **What is the difference between R-290 and standard propane that you can purchase from a hardware store?**  
*R-290 has a much higher purity level. This level is greater than 97.5%. R-290 has a low moisture content. Moisture will damage the refrigeration system and components. Also, there is no scent added to R-290 which is added to standard propane.*
12. **Can I retrofit older cabinet to R-290?** *No. Retrofitting any existing equipment is prohibited.*
13. **Can the same parts be used to service a hydrocarbon cabinet that are used on a 134a/404a cabinet?**  
*Not necessarily. We suggest using OEM parts by specific model number. Parts used on hydrocarbon cabinets must meet specific UL certification for non-incendive or non-sparking components.*

**TRUE TECHNICAL SERVICE**  
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 phone: 1-855-372-1368 • email: [service@truemfg.com](mailto:service@truemfg.com)

TB | 11/2016

**ONLY REFRIGERANT GRADE R290 SHOULD BE USED WHEN SERVICING HC EQUIPMENT.**

- Standard propane does not meet the purity/moisture content needed for a Refrigeration System!
- R-290 does not have the odor additive in it that standard propane does.



**Is Special Labeling  
on Equipment  
Required?**

**YES**



SPECIAL LABELING

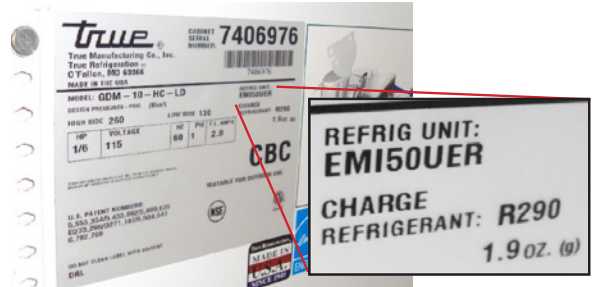
HYDROCARBON LABELING | WHERE WILL THESE BE FOUND?

EXAMPLES  
NORTH AMERICA

EXTERIOR BACK LEFT



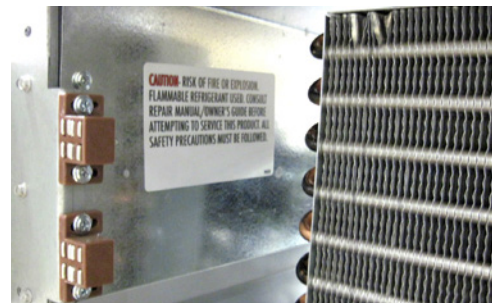
INTERIOR SERIAL TAG



CONDENSER COIL SHROUD



CONDENSING UNIT AREA SIDEWALL



EXTERIOR BACK RIGHT

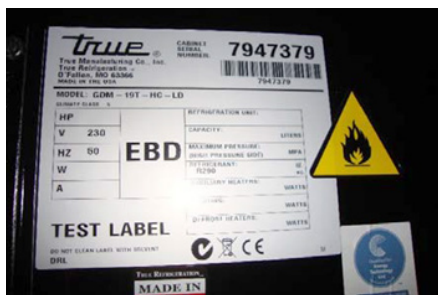


INTERIOR EVAPORATOR TOP/COVER

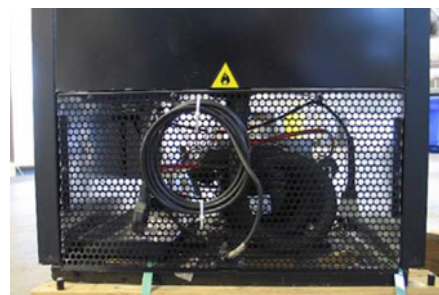


INTERNATIONAL

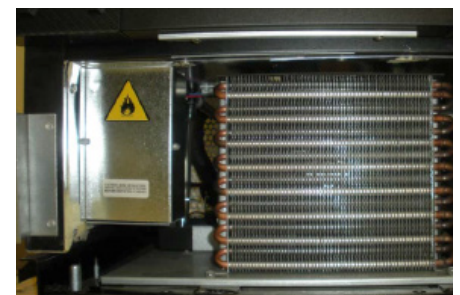
WARNING LABEL NEXT TO SERIAL TAG INSIDE CABINET



WARNING LABEL AT REAR ACCESS AREA



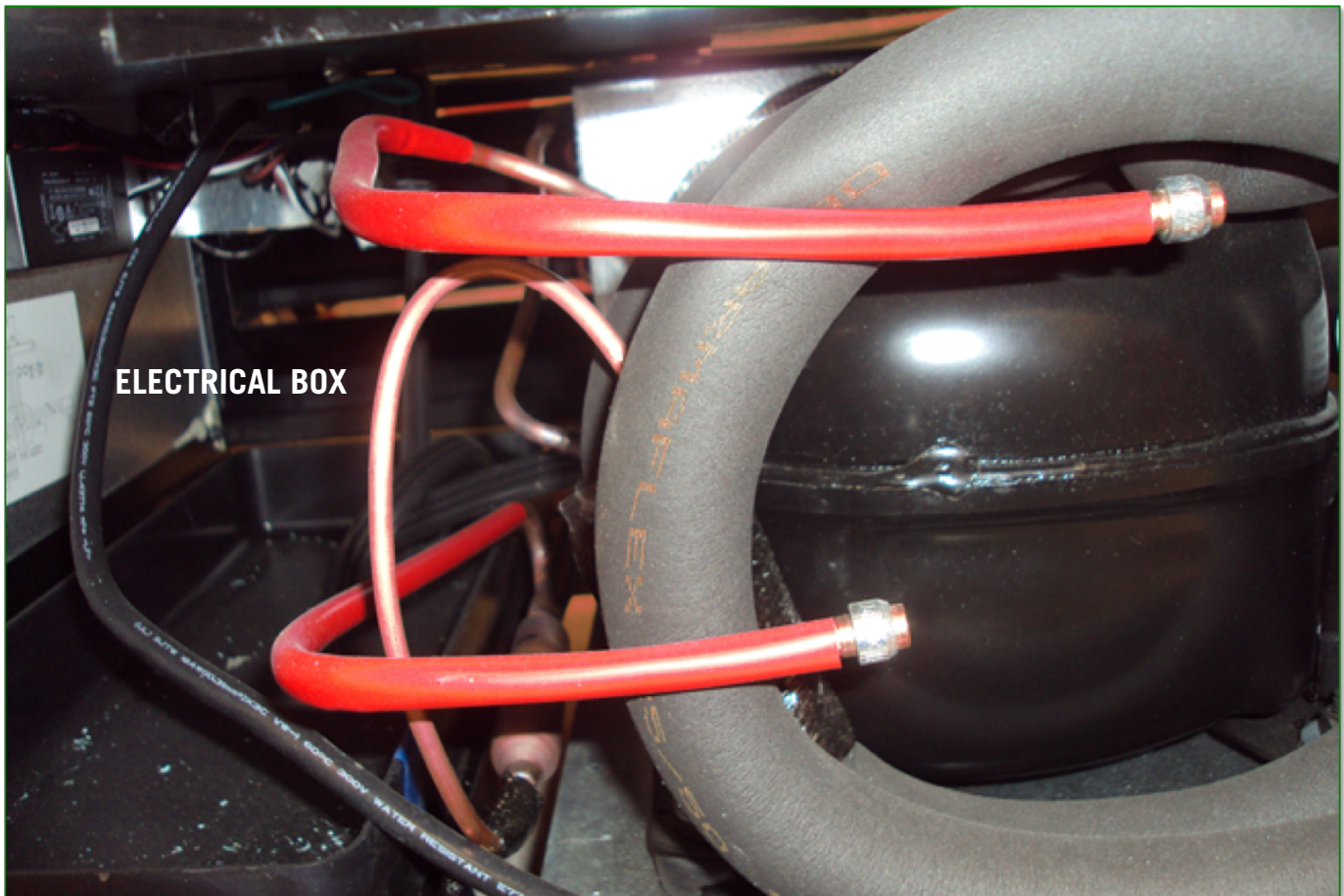
WARNING LABEL VISIBLE ON FRONT SERVICE ACCESS





## SPECIAL LABELING

**ALL PROCESS TUBES MUST HAVE PMS #185 RED SLEEVES**



***Red sleeves must always be  
reinstalled if removed during service  
(North America Only)***

# NOTES

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# What's the Difference in R-290 vs. R-134a/R-404A

## CABINET / COMPONENTS

**NOTE: PARTS USED ON HC CABINETS MUST  
HAVE SPECIFIC UL CERTIFICATION FOR  
NON SPARKING COMPONENTS  
(NORTH AMERICA)**

**Note: Parts used on HC cabinets must comply with  
IEC/EN standards for non sparking components  
(INTERNATIONAL)**



**COMPONENTS**

**ELECTRICAL CONNECTORS**

All electrical connectors must meet a minimum pull force requirement.

**Wire Nut**

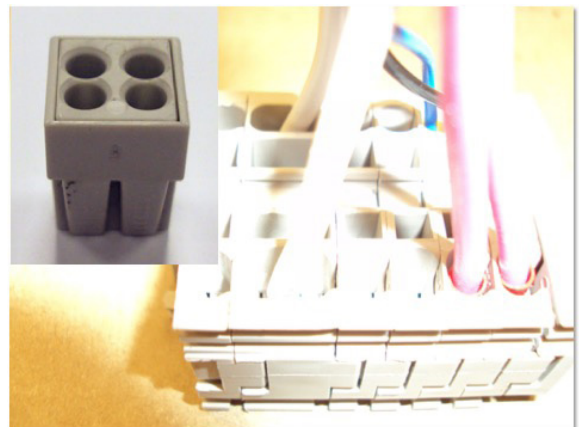
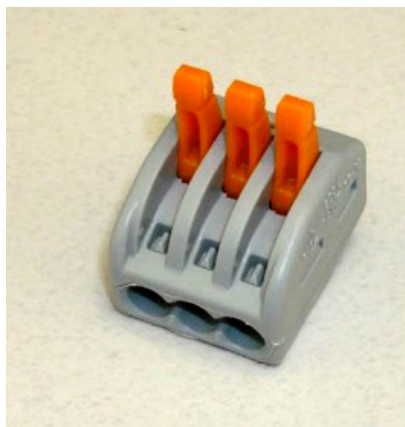


**Crimp Connector**



**Not approved for usage on Hydrocarbon / R-290 systems.**

**R-290**



**Replacement Connectors supplied by True.**

COMPONENTS

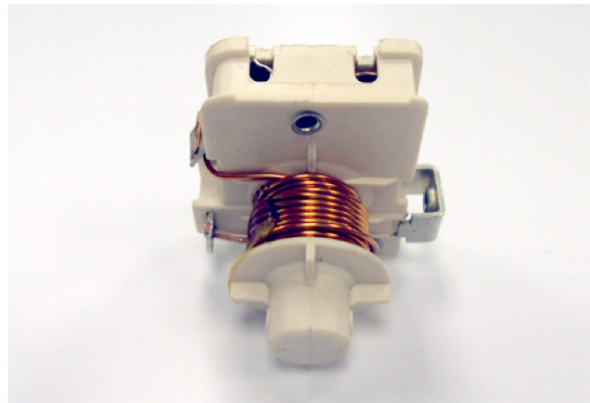
ELECTRICAL SYSTEM - SPARK FREE COMPONENTS

COMPRESSOR RELAY

R-134a/R-404A



R-290



\* All covers should be in place

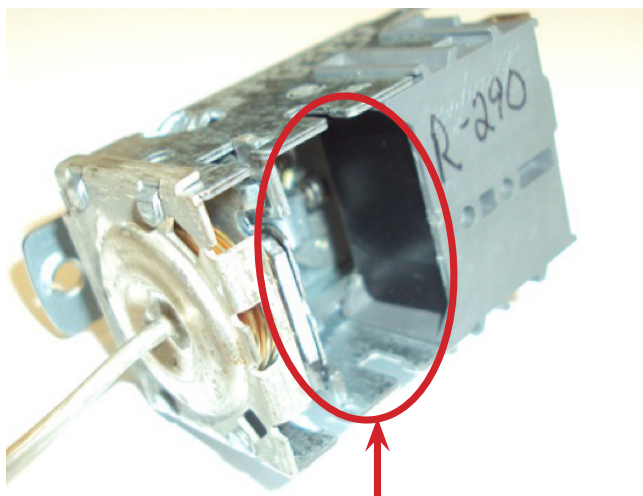
NOTE: PARTS USED ON HC CABINETS MUST HAVE CERTIFICATION FOR NON SPARKING COMPONENTS

COMPONENTS

ELECTRICAL SYSTEM - SPARK FREE COMPONENTS

TEMPERATURE CONTROL - R-290

Mechanical



\* Contacts are enclosed

LAE Electronic Control



Danfoss Electronic Control



Sollatek Electronic Control



NOTE: PARTS USED ON HC CABINETS MUST HAVE CERTIFICATION FOR NON SPARKING COMPONENTS

**COMPONENTS**

**ELECTRICAL SYSTEM - SPARK FREE COMPONENTS**

**FAN MOTOR(S) - R-290**

All motors used by True pass the HC standards for non sparking components.

**R-290**



**NOTE: PARTS USED ON HC CABINETS MUST HAVE CERTIFICATION FOR NON SPARKING COMPONENTS**

**COMPONENTS**

# How Do I Know If the Parts I'm Using are HC/R-290 Compliant?

**Order OEM parts through  
True's Parts Department at:**

**1-800-424-8783**  
**(NORTH AMERICA)**

**or through a  
True Manufacturing  
local distributor.**  
**(INTERNATIONAL)**



# What's the Difference in Servicing HC Systems

The processes used to service HC systems are very similar to current HFC systems (R-134a & R-404a)



**SERVICING****HYDROCARBON / R-290 SPECIFIC****NITROGEN PURGE****BRAZING PROCEDURES**

- Using oxygen free dry nitrogen set pressure to 3-5 PSI (.21/.34 Bar) & purge for 2 minutes prior to brazing. Continue purging nitrogen through system until all brazing is complete.



Procedure required for servicing R-290 equipment.

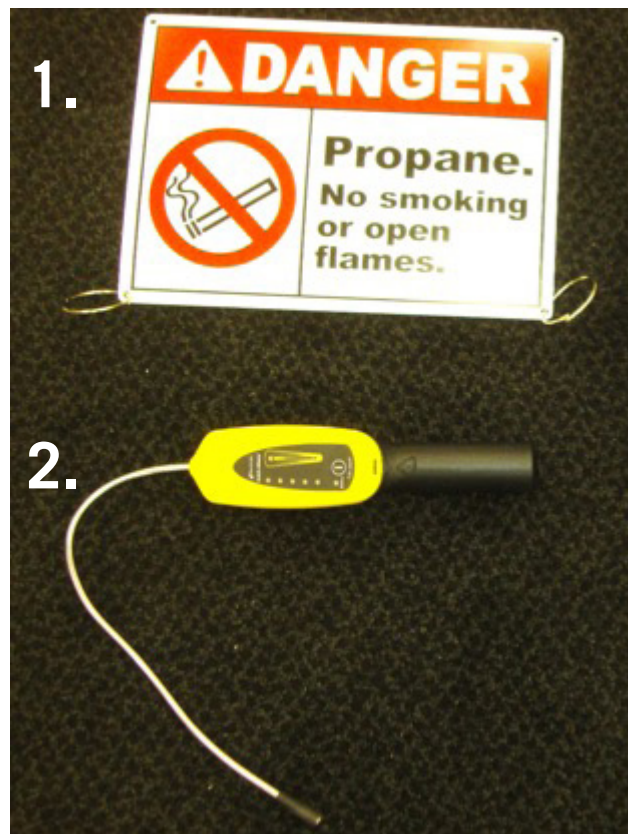
**WHY IS PURGING W/ NITROGEN REQUIRED?**

- To displace any trapped refrigerant in the system.

## TOOLS

## HYDROCARBON / R-290 SPECIFIC

## TOOLS USED SPECIFICALLY FOR HC/R-290 SYSTEM



1. Safety Plackard
2. Combustible Gas Meter  
Inficon Gas Mate  
Model 718-202-GI  
(True Part# 965087)

**TOOLS**

**TOOLS NO LONGER NEEDED FOR HC/R-290 SYSTEM**



HFC recovery system

NOTE: HC VENTING APPROVED BY GOVERNMENT



BUILDING THE FINEST COMMERCIAL REFRIGERATION-TRUE, "The Best of the Cold Ones"

## GOOD REFRIGERATION PRACTICES

Good refrigeration practices will always start with good detective work to find out what caused the failure so we can eliminate the possibility of a repeat failure. Below is a step by step set of procedures we would recommend is followed when repairing a refrigeration system.

- ❑ Before opening the refrigeration system remember that POE oil is very hygroscopic and absorbs moisture very quickly. You should not leave the system open to the atmosphere for more than 15 minutes. Any vacuum that exists before any repair should be broken with nitrogen to avoid moisture being pulled into the system.
- ❑ For your manifold gauges, use as short of refrigeration hoses as possible. We recommend maximum of 12" (304.8 mm) hoses.
- ❑ Always replace the drier with the exact OEM size when opening the refrigeration system.
- ❑ Recover the refrigerant from the system. NOTE: R-290 can be vented in a well ventilated area with no source of ignition.
- ❑ The introduction to the refrigeration system of anything other than a flushing agent, nitrogen, refrigerant, or oil is prohibited.
- ❑ Remove the faulty refrigeration component and filter drier by cutting them out with a tubing cutter.
- ❑ If you are changing a component keep the system closed up with plugs or caps to reduce moisture contamination.
- ❑ Take a look at the filter drier and the components that have been removed for signs of oil breakdown, foreign objects like desiccant from drier, metal pieces from valves, etc.
- ❑ When replacing a compressor make sure to also remove all old oil from the system.
- ❑ While purging nitrogen through the system drill (approximately 1/8") (3.18 mm) hole in the bottom of the accumulator (**IF EQUIPPED**) so we do not leave contaminated oil in the system. After blowing this out with nitrogen, be sure to braze the hole closed.
- ❑ Be sure and test the oil from the refrigeration system for contamination using the proper test kit for the type of oil.
- ❑ If the oil shows signs of contamination or there was a restriction in the system, all of the oil must be removed and replaced. This can be accomplished by removing the compressor and flushing the entire system with nitrogen. Remove all the oil in the compressor, and in the accumulator. Measure all the old oil in a measuring cup and replace the exact amount you removed with the new oil. If necessary, a flushing agent can be used for cleanup.
- ❑ When brazing an R-290 system always purge nitrogen through the system 2 minutes before brazing and during the entire brazing process.
- ❑ Place a nitrogen charge in the system to check for any leaks. **Use maximum 200 PSI (13.8 Bar).**
- ❑ Release the nitrogen charge down to about 2 pounds of positive pressure (.1379 bar).
- ❑ Start pulling a vacuum as soon as possible to help remove any moisture from the system. Remember that any moisture that is absorbed by the POE oil cannot be removed and we must start the process over.
- ❑ Change vacuum pump oil regularly to ensure the deepest vacuum your pump is capable of.
- ❑ Using a micron gauge, pull the system down to hold a minimum of 500 microns.
- ❑ See if the system will hold this micron with the gauges closed and the pump switched off to test for leaks or moisture.
- ❑ Once the system is evacuated, weigh in the listed refrigerant charge located on the serial tag inside the cabinet. R-290 can be added as a liquid or vapor. Refrigerant 134a/404A charge as a liquid only. Refrigerant should be charged through the high side.
- ❑ Test run the unit and check for proper operation.

**ANY NITROGEN ADDED TO THE SYSTEM SHOULD NOT EXCEED 200 PSI (13.8 BAR).**

PLEASE CALL TRUE TECHNICAL SERVICE WITH ANY QUESTIONS REGARDING THE ABOVE PRACTICES.

**1 855 372 1368**

[www.service@truemfg.com](http://www.service@truemfg.com)

**WORLD HEADQUARTERS: O'FALLON, MISSOURI, USA**

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México, Distrito Federal  
**+52 555 804 6343/6344**  
9:00AM – 5:30PM M-F

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#7009 • Las Condes •  
Santiago, Chile C.P. 7560764  
**+56 232 13 3600**  
9:00AM – 5:30PM M-F

**SERVICING****SAMPLE OF GOOD REFRIGERATION PRACTICES**

- Use the shortest hoses on your gauges as possible (because of smaller refrigerant charge).
- Bleed refrigerant back into system when removing line taps.



SAME PROCEDURES USED WITH ALL REFRIGERANTS INCLUDING HC/R-290

## SERVICING

## GOOD REFRIGERATION PRACTICES

Micron Gauge - Make sure to pull a 500 micron vacuum before doing service on a system.



SAME PROCEDURES USED WITH ALL REFRIGERANTS INCLUDING HC/R-290

**SERVICING**

## CHARGING THE SYSTEM

- Ensure that the system has been leak checked.
- Evacuate system to a minimum 500 micron.
- Weigh in the correct charge.
- Leak check the system again.
- Bleed the refrigerant from the high side hose to the low side hose.
- Carefully disconnect the hoses, to limit the refrigerant loss.
- Remove line taps.

SAME PROCEDURES USED WITH ALL REFRIGERANTS INCLUDING HC/R-290



## SERVICING

## SEALING THE SYSTEM

We recommend removing line taps from the system. Use a pinch off tool prior to sealing the ends of the process tubes. Thoroughly leak check process tube ends before brazing.



SAME PROCEDURES USED WITH ALL REFRIGERANTS INCLUDING HC/R-290

# NOTES

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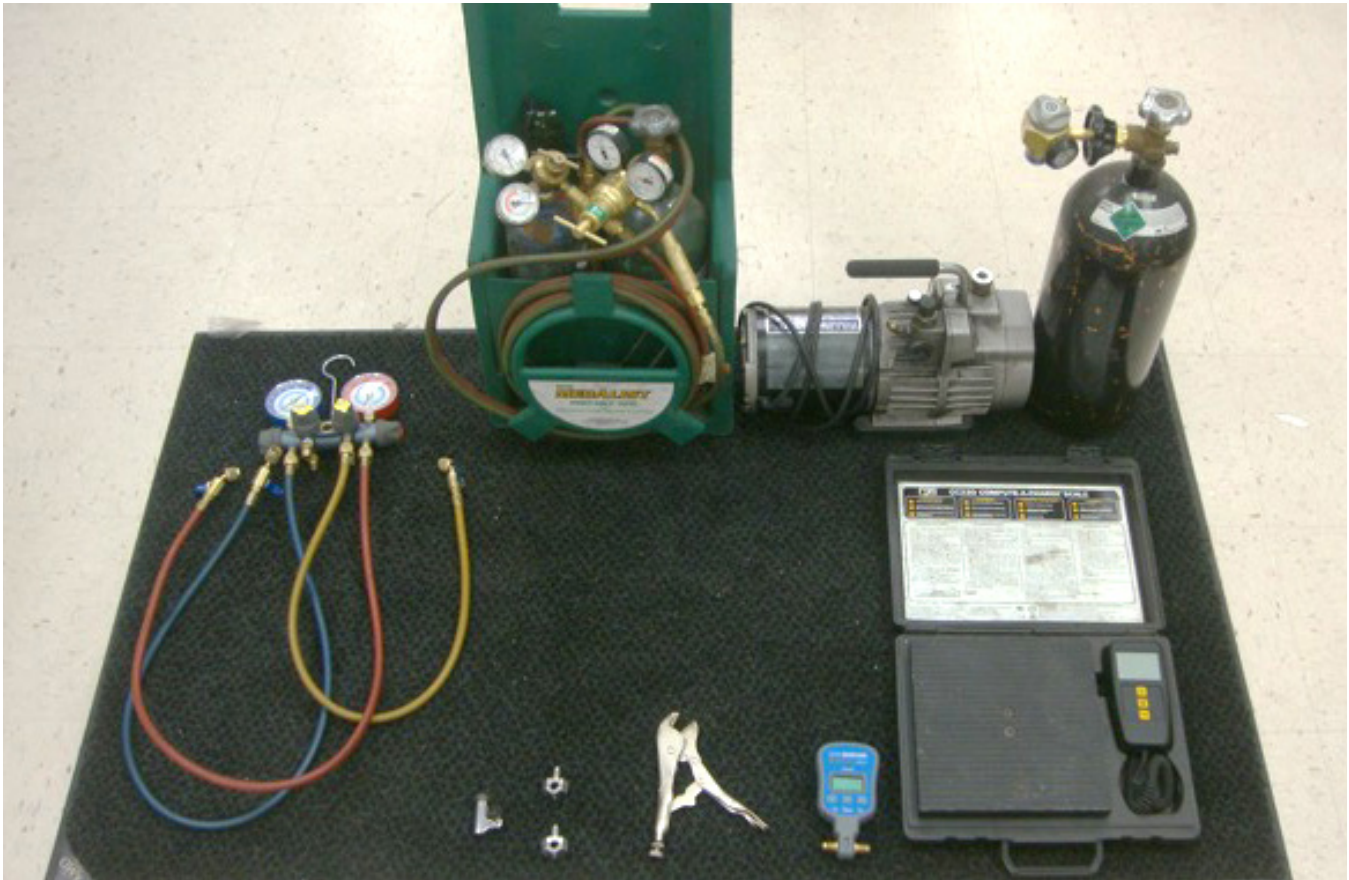
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# What's the Difference in the tools used?



**TOOLS****TOOLS USED FOR ALL SYSTEMS INCLUDING HC/R-290**

1. Torches
2. Manifold set
3. Vacuum pump
4. Oxygen free dry nitrogen
5. Scale
6. Micron gauge
7. Pinch off tool
8. Temporary line taps
9. Tubing Cutter

## TOOLS

## TOOLS USED FOR ALL SYSTEMS INCLUDING HC/R-290

**GENERAL PRECAUTIONS**

- All appropriate and necessary tools and equipment are available to include a CO<sup>2</sup> or dry-power type fire extinguisher.

**This procedure needs to be followed when working on any system.**





# R-290 TOOLS



## R-290 TOOLS

## R-290 SERVICE KIT

Kit# 992987



### KIT INCLUDED

1. COMBUSTIBLE GAS METER  
 Inficon Gas Mate  
 Model 718-202-GI  
 (True Part# 965087)

2. Safety Plackard  
 3. Charging Valve  
 4. Pinch off tool  
 5. 12" Refrigeration  
 hose

**FOR KIT CONTACT TRUE'S PARTS DEPARTMENT:  
 1-800-424-8783  
 (NORTH AMERICA)**

For International purchase, use contacts on rear page applicable to your area.



## FOR ANY OTHER QUESTIONS RELATED TO R-290, PLEASE CONTACT TRUE TECHNICAL SERVICE

### WORLD HEADQUARTERS:

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 Fri 7:00 AM - 6:00 PM (CST)  
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# HYDROCARBON

ENERGY EFFICIENCY • PERFORMANCE • SAVINGS

## TRUE TECHNICAL SERVICE

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